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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,321	08/30/2001	Stuart A. Sanders	01 - 414	8735

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EXAMINER

JACKSON, ANDRE L

ART UNIT

PAPER NUMBER

3677

DATE MAILED: 08/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,321

Applicant(s)

SANDERS ET AL.

Examiner

Andre' L. Jackson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-14 and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,388,959 to Forrester et al in view of USPN 6,475,253 to Culler et al. Forrester et al discloses a seal assembly for use in a gas turbine engine comprising a seal substrate (22) and an abradable seal material applied to a bond layer (42); the abradable seal material being composed of a densified epoxy foam; and an engine component adapted for motion relative to the seal assembly and having an abrasive portion (defined by its end tip) interacting with the abradable seal material, whereby the abrasive portion of the engine component and the abradable seal material of the seal assembly cooperate to provide sealing. However, Forrester et al does not specifically disclose that the abradable seal material is composed of a polyimide foam. It is well known within the art that an epoxy resin is made of a polymeric material. Culler et al teaches abrasive articles including substrates or particles bonded thereto (column 19, lines 47-66). These abrasive articles can be bonded, coated or non-woven abrasive articles. Suitable material for coated or bonded articles may include polymeric foam. Culler et al goes further to give information of various types or equivalent composition of polymeric material, which include a polyimide film. Since the epoxy foam as disclosed by Forrester et al is equivalent to a polyimide foam taught by Culler et al, the selection of any of these known equivalents bonded to a layer as

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claimed, would be within the level of ordinary skill in the art. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to modify the seal assembly of Forrester et al to include the polyimide material as taught by Culler et al to provide an improved abradable seal capable of resisting variant thermal energy without deformation or rupture, thus ensuring effective sealing properties.

Referring to claims 4-6 and 19-21, Forrester et al discloses that the epoxy foam has a density of 25 pounds per cubic foot.

Referring to claims 7 and 22, Forrester et al does not disclose shear strength of the epoxy foam within a range of 140 psi to 325 psi, however, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to modify the seal assembly of Forrester et al, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges as claimed involves only routine skill in the art.

Referring to claims 9, 10, 13 and 14, Forrester et al discloses a stator casing (10) affixed to the seal substrate, which provides an annular surface, which is disposed between tips (26) of fan blades (28) of a rotor (30). See column 2, lines 40-45.

Claims 11 and 18, the epoxy foam is a thermo-mechanically densified foam. See column 3, lines 9-37.

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Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrester et al in view of Culler et al and further in view of USPN 3,834,001 to Carroll et al. Forrester et al as described above, includes a bond layer of densified epoxy foam disposed at a seal face or an inner annular surface, but Forrester et al does not disclose a seal substrate comprising a plurality of layers of densified epoxy foam. Carroll et al teaches a seal element (22) usable as a seal in a turbo-machine. The seal element includes a radial extending inner seal face (24) and rear face (26). Sheets or layers (27) are stacked and bonded to one another with their edges at the seal face and rear face respectively. Each layer includes a laminated plane (28) arranged perpendicular to an engine wheel. The seal structure providing a low density, which may be abraded without undue damage to structure which comes in contact with it. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to modify the seal assembly of Forrester et al to include multiple laminate layers as taught by Carroll et al to provide an abradable seal having a low density and good resistance to structure which comes in contact with it.

Allowable Subject Matter

Claim 16 is allowed.

Response to Applicant's Arguments

Applicant's arguments filed in Amendment B on May 29, 2003 have been fully considered but they are not persuasive. Applicant's argument's on page 5 of the above amendment state that the combination rejection of Forrester et al in view of Culler et al is improper because in order to have a valid obviousness rejection the secondary reference (Culler et al) must contain motivation to form an abradable seal to be used in a gas turbine from a densified polyimide foam.

In response to this argument, the Examiner would like to point out in applicant's claims, the limitation "for use in a gas turbine engine having improved durability" recites intended use of an air seal. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham, 2 USPQ2d 1647 (1987)*

Since Forrester et al satisfies the structural limitations of an air seal, the obvious type rejection made in combination with Culler et al is proper. Moreover, even with applicant's claims positively citing the combination/subcombination of a seal and gas turbine engine as in claims 12-24, the teaching from Culler et al is only directed to the material composition of a product. All other limitations are inherent in the disclosure of Forrester et al. Further, it is believed that the method of making an abrasive article including polyimide material as taught by Culler et al is analogous to an abradable seal composed of an epoxy foam disclosed by Forrester et al and an obvious-type rejection with proper motivation is explained above in this Action.

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As to applicant's arguments on page 6, second paragraph, it has been held that discovering optimum ranges or an optimum value of a result an effective variable involves only routine skill in the art.

Regarding applicant's arguments on page 7, Forrester discloses a sheet or strip (42) having a longitudinal outer edge of an adhesive material or layer that bonds to an inner surface (41). See column 2, lines 64-67 and as shown in Fig. 3.

For the above reasons and explanations, applicant's claims 1-15 and 17-24 remain rejected over Forrester et al in view of Culler et al and further in view of Carroll et al.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre' L. Jackson whose telephone number is (703) 605-4276.


The examiner can normally be reached on Mon. - Fri. (10 am - 6 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on (703) 308-3179. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9326 for regular communications and (703) 872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1018.

André L. Jackson
Patent Examiner
AU 3677

ALJ
July 29, 2003


ROBERT J. SANDY
PRIMARY EXAMINER